A note on the female and eggs of Hemirhamphus far (Forsk) (Pisces, Exocoetoidea)

By J. H. WICKSTEAD, B.SC.
Singapore Regional Fisheries Research Station

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DURING ROUTINE plankton collections on the moonless evening of Friday, 19th August, 1955, the usual small collection of a dozen or so fish were attracted to the launch. Of those caught with a hand net, two proved to be running ripe females of the species *Hemirhamphus far* (Forsk). Identification was made from Weber and de Beaufort. Eggs were squeezed from these fish into a jar of clean sea water. It was hoped that a ripe male would be caught thus enabling the eggs to be fertilised. However this, was not to be, and so, after allowing sufficient time for any expansion to take place, the eggs were preserved in 5 per cent sea water formalin. Although, most unfortunately, these are not fertile eggs, at least they are eggs with characteristic features coming from a known parent, and should be sufficiently distinctive to enable identification of the fertile egg to be made. This latter point is most important in these waters as so little is known about the correlation of fish eggs with the adults.

The adult female and condition of the ovaries

The lengths of the two specimens were taken, as were the dimensions of the ovaries and the number of ripe eggs contained within them. The sizes given for the ovaries must be taken as approximations only in view of possible shrinking in the interval of two and a half days between catching and measuring.

Specimen (1)		Specimen (2)	
Standard length ..	24·1 cm.	Standard length ..	22·0 cm.
Overall length ..	27·7 cm.	Overall length ..	25·5 cm.
Dimensions of right ovary	8·3 cm. long ·5 cm. diameter	Dimensions of right ovary	7·7 cm. long ·5 cm. diameter
Dimensions of left ovary	7·7 cm. long ·5 cm. diameter	Dimensions of left ovary	7·4 cm. long ·5 cm. diameter
Number of ripe eggs in right ovary ..	89	Number of ripe eggs in right ovary ..	38
Number of ripe eggs in left ovary ..	79	Number of ripe eggs in left ovary ..	33

The number of eggs extruded into the jar was counted and totalled 218.

From the above figures the total number of ripe eggs in the two pairs of ovaries was 457. Assuming that the eggs of specimen 2 were rather more readily shed than those of specimen 1, and making allowance for the slight difference in size, a rough calculation shows that the ovaries of 1 (contained 235 ripe eggs; those of 2) 222 ripe eggs. This, of necessity, is a very rough guide, and assumes that none of the eggs had been shed previous to capture. From the state of both pairs of ovaries it is fairly certain that, if any eggs had been previously shed, the number was very small. This leaves the

rough, but reasonable, assumption that a ripe female of this species, and approximating to these sizes, sheds only about 250 eggs at any one spawning; a very small number indeed.

The Eggs. Measuring a large number of the unripe eggs in the ovaries, and plotting the results on a frequency distribution curve, it was found that four modes were present on the curve, representing four stages of egg development. This includes the ripe eggs. The average sizes of the four stages are:—

(1) ·115 mm.
(2) ·615 mm.
(3) 1·346 mm.
(4) 2·720 mm.

It is interesting to note that Hall, (1956) in his investigations into the related flying fish *Hirundichthys affinis* (Günther) also found four stages of egg development present in the ovary.

The shape of the ripe egg was not quite spherical. Of the number measured, the averages were 2·79 mm. for the larger diameter, and 2·68 mm. for the smaller. The blastoderm occurred on the larger diameter. The sizes of the eggs were very constant.

The egg size is very large indeed, certainly one of the largest to be found in these waters. (Delsman, 1924).

The eggs, when extruded into the sea water, at once sank, and thus are to be excluded from the normal types of pelagic eggs. However, as is common in this group of fish, the eggs are provided with long filaments, several centimetres long. These filaments intertwine with those of neighbouring eggs, the result being a group of eggs, very much like a bunch of grapes, strung together by intertwining filaments. The numbers of eggs in the groups varied from about 20 to 50. It can be assumed that, in the normal course of events, the eggs would be attached to some floating object such as a piece of wood or a floating leaf, etc.

After close examination and reconstruction of the egg with a ball of plasticine, using matchsticks for the filament origins, it was clear that the filaments were present on the surface of the egg in a definite pattern, the number of filaments present being 23 or 24. Figs. 1 and 2 on Plate 7 are diagrammatic drawings to show the pattern. The shaded area represents the blastoderm. For orientation, assume that the blastoderm is the north pole. In a view directly on to the north pole there will be seen a central filament which is surrounded by a rough circle of six other filaments (Fig. 1). A view directly on to the south pole will show the same picture. A view looking down onto the equator shows that around the equator are disposed the remaining nine or ten filaments in the form of a zig-zag line. Thus, as shown in Fig. 2, the egg can be divided into three zones; a north pole with a group of seven filaments; a south pole with a similarly disposed group of seven filaments, and an equatorial band consisting of nine or ten filaments arranged in a zig-zag line. These were constant features of the eggs examined.

The filaments themselves were simple in structure consisting of a short proximal base with a tapering distal portion. (Fig. 3).

The surface of the egg was not smooth, but consisted of a large number of small ridges, the general appearance being not unlike a piece of onion scale under the microscope. (Fig. 3).

The points shown above should be sufficient for these eggs to be recognised when found away from the parent.

References

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Explanation of Plate 7

1. Diagram of filament arrangement as seen when viewed directly onto the blastoderm. Only the filament origins are shown.
2. Diagram of filament arrangement as seen when viewed directly onto the equatorial region. Only the filament origins are shown.
3. High power drawing of a filament origin showing the basal joint and the surface of the egg. The maximum diameter of the basal joint is 0·039 mm.

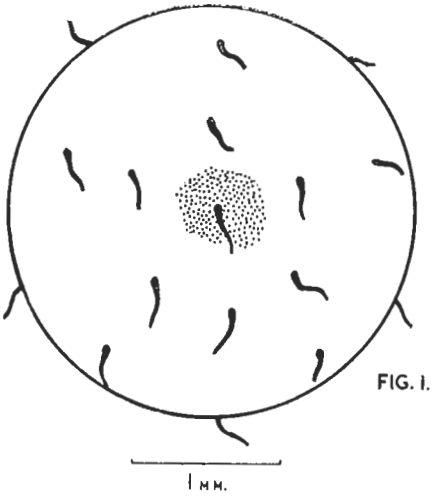

FIG. 1.

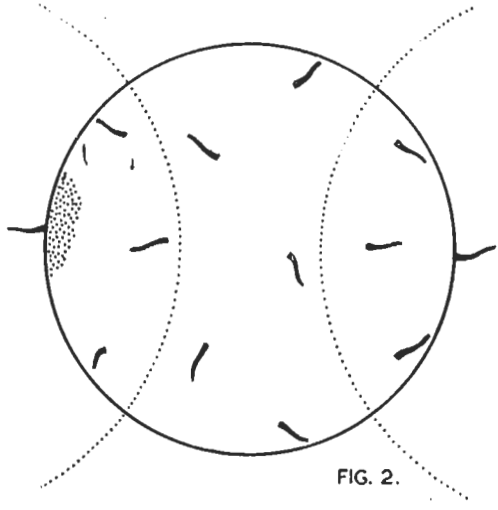

FIG. 2.

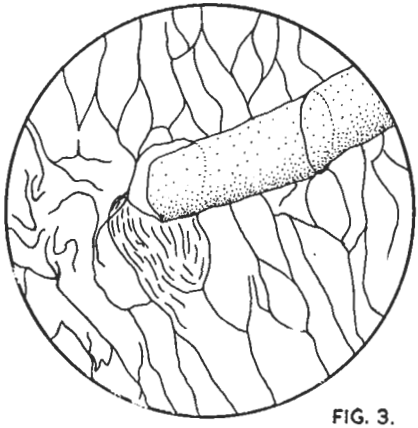

FIG. 3.

Eggs of *Hemirhamphus far.* (J. Wickstead).